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(54) Title: **ELECTROPHORESIS APPARATUS**

(57) Abstract: An electrophoresis apparatus for measuring, characterizing and/or altering a composition of a sample. The apparatus comprises an anode compartment having an anode and a cathode compartment having a cathode. The anode and cathode are spaced at a distance from one another to define an electric field having a direction along a longitudinal axis, and between the anode and cathode compartments can be at least one separation compartment. Each compartment includes means for adding or removing a solution, a first dimension orthogonal to the direction of the electric field, a second dimension orthogonal to the electric field and the first dimension, and a third dimension parallel to the electric field and orthogonal to the first and second dimensions. A ratio of the first and second dimensions define an aspect ratio, at least one aspect ratio being less than one. An ion-permeable barrier is positioned between each compartment to prevent convective mixing therebetween. At least one of the compartments can be made of an electrically insulating material having a thermal conductivity greater than about 1 W/mK and a specific heat greater than about 100 J/kgK.

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